



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------|------------------|
| 10/719,614 | 11/21/2003 | Duck-Chul Hwang | 51089/DBP/Y35 | 3144 |
| 23363 | 7590 | 03/22/2006 | EXAMINER | |
| CHRISTIE, PARKER & HALE, LLP PO BOX 7068 PASADENA, CA 91109-7068 | | | CHU, HELEN OK | |
| | | ART UNIT | PAPER NUMBER | |
| | | | 1745 | |

DATE MAILED: 03/22/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|------------------------|---------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 10/719,614 | HWANG, DUCK-CHUL | |
| | Examiner | Art Unit | |
| | Helen O. Chu | 1745 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 2/27/06.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) 1-15 is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 16-30 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 21 November 2003 is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

| | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____. |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>11/21/03, 11/10/04, 8/17/05</u> | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| | 6) <input type="checkbox"/> Other: _____. |

DETAILED ACTION

Election/Restrictions

1. Applicant's election of claims 16-30 in the reply filed on February 26, 2006 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)). Claims 1-15, therefore, are withdrawn from consideration.

Claim Objections

2. Claims 19-20 are objected to because of the following informalities: The recitation "particle size D" is unclear. Please revise the stated recitation to "particle size diameter."

3. Claim 26 is objected to because of the following informalities: Claim 26 is dependent on claim 15. Therefore, claim 26 is also withdrawn from consideration.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 17 recites the limitation "the metal" in line 1. There is insufficient antecedent basis for this limitation in the claim. Please revise "the metal is" to "the metal oxide or metal sulfide consist of a metal"

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

Art Unit: 1745

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 16-18 and 27-30 are rejected under 35 U.S.C. 102(b) as being anticipated by Gorkovenko et al. (US Patent 6,210,831).

In regards to claims 16-18, Gorkovenko et al. teaches a cathode with electroactive sulfur material in a battery (Title) with conductive filler (Column 5, line 65), a binder (Column 6, Line 5) and an aluminum oxide additive (Column 15, Line18).

In regards to claims 27-30, the Gorkovenko et al. reference discloses a coating layer (Column 22, Line46-47) that comprises a polyethylene oxide, silica, and a conductive carbon (Column 22, 35-40)

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 19-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gorkovenko et al as applied to claims 16-18 and 27-30 above, and further in view of Bi et al. (US Patent 5,952,125)

The Gorkovenko et al. reference teaches the elements of claims 16-18 and 27-30 above and further incorporated herein. The Gorkovenko et al reference further discloses that cathodes that include metal oxide are beneficial in increasing the energy density (Column 15, Lines 9-13), however, the Gorkovenko et al reference does not disclose a

Art Unit: 1745

particle size diameter of 5 to 5000nm. However, the Bi et al reference teaches that cathodes with compositions that intercalate lithium for use in a battery are metal oxides. (Column 1, Lines 31-33). Batteries based on metal oxides (vanadium oxide) that are nanoparticles of 5nm 1000nm (Column 1, Lines 42-44) increases energy density compared with larger diameter metal oxide particles (Column 2, Lines 11-19). Therefore, it would have been obvious to one of ordinary skill at the time the invention was made to incorporate metal oxides of 5nm to 1000nm as taught by Bi et al. into the cathode in a lithium-sulfur battery to improve performance characteristics.

9. Claims 23-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gorkovenko et al.

Gorkovenko et al. discloses the elements of 16-18 and 27-30 above and further incorporated herein. The disclosure of Gorkovenko et al. reference differs from the Applicant's claims in that Gorkovenko et al do not disclose the specific values of weight percentage used. However, Gorkovenko et al. recognizes that solid composites of cathodes that comprised a metal oxide will increase the energy density. Therefore, it would have been obvious to one of the ordinary skill in the art at the time of the invention to choose the instantly claimed value through process optimization, since it has been held that the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable values involve only routine skill in the art. See *In re Boesch*, 205 USPQ 215 (CCPA 1980).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Helen O. Chu whose telephone number is (571) 272-5162. The examiner can normally be reached on Monday-Friday 8am-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

HOC



DAH-WEI YUAN
PRIMARY EXAMINER